

**AUTOMATIC SELECTION OF ILLUMINATION SOURCE FOR HYBRID
DIGITAL CAMERAS**

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CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is related to Application No. xx/xxx,xxx entitled, "Combination
LED and Strobe Lighting Device," filed on or about the same date as the present
application, and hereby incorporated herein by reference. Application No. xx/xxx,xxx
10 discloses and claims a device including both a strobe tube and at least one LED
configured to switch between the strobe and the LED based on a mode of operation.

FIELD OF THE INVENTION

15 [0002] The present invention relates generally to the field of photography and more
specifically to the field of lighting of photographic subjects for still and video
imaging.

BACKGROUND OF THE INVENTION

20 [0003] Many modern digital cameras include both a still photography mode and a video
mode. In the video mode, short moving video clips are captured by the digital
camera. These video clips may range in length from a few seconds to several
minutes. The lighting requirements for these two modes of operation are significantly
different. In digital still cameras a very bright flash for scene illumination is often
25 desired so that high shutter speeds can be used to stop and freeze any motion in the
scene being captured. In video mode, a more uniform constant light source is desired.

SUMMARY OF THE INVENTION

[0004] A digital camera is built having a still mode and a video mode. The camera is configured to control two different light sources. When the camera is in still mode, it is configured to fire a strobe during capture of the image. When the camera is in video mode, it is configured to turn on a continuous light source during capture of the video. These two different light sources may be combined into a single unit or may exist as separate devices. In video mode, a partial depress of the shutter control may turn on the continuous light source prior to exposure, allowing the light source to stabilize before video capture begins.

[0005] Other aspects and advantages of the present invention will become apparent from the following detailed description, taken in conjunction with the accompanying drawings, illustrating by way of example the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Figure 1 is front view of an example embodiment of a digital camera including a lighting control output according to the present invention.

[0007] Figure 2 is front view of an example embodiment of a digital camera including a lighting control output and attached to an off-camera flash according to the present invention.

[0008] Figure 3 is a cross-sectional view of a lighting device including two LEDs, a strobe, and a single reflector.

[0009] Figure 4 is a cross-sectional view of a lighting device including one LED, a strobe, and two reflectors.

DETAILED DESCRIPTION

[0010] Figure 1 is front view of an example embodiment of a digital camera including a lighting control output according to the present invention. An example embodiment of a camera **100** constructed according to the present invention may include a camera body **102**, a lens **106**, a flash **104**, an external viewfinder window **108**, a shutter release **110**, and a control **112**. In an example embodiment of the present invention, the control **112** may be used to select a mode of the digital camera. These modes may include a still photo mode and a video mode. This example embodiment of the present invention also includes two lighting control outputs. A first output **114** outputs a first signal that is used to fire an off-camera flash when the camera is in still mode. A second output **116** outputs a second signal that is used to activate an off-camera continuous light when the camera is in video mode. In some example embodiments of the present invention, when the shutter release **110** is partially depressed, the camera is configured to send a signal to the second output **116** activating the continuous light before the shutter release **110** is fully depressed, starting the video capture. This allows the continuous light some time to turn on and stabilize before video capture begins. As with all digital cameras, this example embodiment of the present invention includes a circuit **118** electrically connected to the shutter release **110**, configured to generate the first and second signals, and electrically connected to the first output **114** and the second output **116**. This circuit **118** includes a means for detecting when the shutter release **110** is depressed. In some example embodiments of the present invention, the circuit **118** may also be configured to detect when the shutter release **110** is partially depressed. Note that the digital camera **100** in this example embodiment of the present invention includes a built-in flash **104** or other means for creating a flash of light. In some embodiments of the present invention, this built-in flash **104** may be used in still mode instead of

triggering an external flash. However, some embodiments may allow the user to select between firing the built-in flash **104** and triggering an external flash through the first output **114**.

[0011] Figure 2 is front view of an example embodiment of a digital camera attached to a lighting device including a LED and a strobe according to the present invention.

Similar to the digital camera of Figure 1, this example embodiment of a camera includes a camera body **202**, a lens **206**, an external viewfinder window **208**, a shutter release **210**, a control **212**, a hot shoe **220** including hot shoe electrical contacts **224**.

As with all digital cameras, this example embodiment of the present invention

includes a circuit **226** electrically connected to the shutter release **210**, configured to generate the first and second signals, and electrically connected to the first output **216** and the second output **220**, and to the hot shoe electrical contacts **224**. This circuit **226** includes a means for detecting when the shutter release **210** is depressed. In some example embodiments of the present invention, the circuit **226** may also be

configured to detect when the shutter release **210** is partially depressed. In an example embodiment of the present invention, the control **212** may be used to select a mode of the digital camera. These modes may include a still photo mode and a video mode. This example embodiment also includes dedicated lighting control outputs separate from the hot shoe electrical contacts **224**. A first output **216** outputs a first signal that is used to fire an off-camera flash when the camera is in still mode. A second output **220** outputs a second signal that is used to activate an off-camera continuous light when the camera is in video mode. Both the first and second outputs **216**, **220**, and the hot shoe electrical contacts **224** may be used to control a mode of one or more lighting devices **200**. Note that unlike the camera of Figure 1, this example embodiment of the present invention does not include a built-in flash. Thus,

when a flash is required in still mode, an external flash must be triggered by the first output **216** or the hot shoe electrical contacts **224**. This example embodiment of the present invention includes a lighting device **200** with a combined LED and strobe **204**, a first input **218**, a second input **222**, and a switch **214**. The first input **218**,
5 second input **222**, and the switch **214** may be used to select a mode of the flash. In a still mode, the strobe of the flash is activated when triggered by the camera. This triggering may occur through the first control input **218**. In a video mode, the LED is activated when triggered by the camera. This triggering may occur through the second input **222**. In an example embodiment of the present invention, the switch **214**
10 may allow a user to override the mode signal communicated from the camera through the outputs **216**, **220** into the inputs **218**, **222** of the lighting device **200**. Those of skill in the art will also recognize that a hot shoe is not the only possible means for non-permanently mechanically coupling a lighting device to the digital camera. Some lighting devices attach to a camera through the tripod mount and electrically connect
15 to a camera through any of a wide variety of electrical cords, such as PC cords. In such example embodiments of the present invention the first and second outputs (means for outputting first and second signals) may be present in a wide variety of configurations within the scope of the present invention.

[0012] Figure 3 is a cross-sectional view of a lighting device including two LEDs, a
20 strobe, and a single reflector. This example lighting device may be used with digital cameras build according to the present invention. This example lighting device includes both a strobe for taking flash still photos, and a pair of LEDs that may be illuminated as a continuous light source for shooting video. In this example embodiment a lighting device **300** is built including a body **302** with supports **312** for

a reflector **308** and a lens **310**. In this lighting device two LEDs **306** share the common reflector **308** with a strobe tube **304**.

[0013] Figure 4 is a cross-sectional view of a lighting device including one LED, a strobe, and two reflectors. This example lighting device may be used with digital cameras build according to the present invention. This example lighting device includes both a strobe for taking flash still photos, and an LED that may be illuminated as a continuous light source for shooting video. In this example embodiment a lighting device **400** is built including a body with supports **414** configured to mechanically affix a first reflector **406**, a first lens **410**, a second reflector **408**, and a second lens **412**. A strobe tube **402** is configured to use the first reflector **406** and the first lens **410**, while a LED **404** is configured to use the second reflector **408** and the second lens **412**. This lighting device includes a hot shoe foot **416** including flash input connections **418** configured to electrically couple to the hot shoe of the camera shown in Figure 2. When used with the digital camera shown in Figure 2, the camera and lighting device may be electrically coupled through the hot shoe electrical contacts **222** and the corresponding flash input connections **418** on the hot shoe foot **416**. When the digital camera is in still mode, it signals the lighting device through the hot shoe electrical contacts **222** to fire the strobe tube **402** during exposure. When the digital camera is in video mode, it signals the lighting device through the hot shoe electrical contacts **222** to activate the LED **404** continuously during the video capture.

[0014] The foregoing description of the present invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form disclosed, and other modifications and variations may be possible in light of the above teachings. The embodiments were chosen and

described in order to best explain the principles of the invention and its practical application to thereby enable others skilled in the art to best utilize the invention in various embodiments and various modifications as are suited to the particular use contemplated. It is intended that the appended claims be construed to include other
5 alternative embodiments of the invention except insofar as limited by the prior art.